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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,722	03/19/2004	Beohm-Rock Choi	21C-0081	7498

23413 7590 05/21/2009
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EXAMINER	
MANDEVILLE, JASON M	

ART UNIT	PAPER NUMBER
2629	

NOTIFICATION DATE	DELIVERY MODE
05/21/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No.	Applicant(s)	
	10/804,722	CHOI ET AL.	
	Examiner	Art Unit	
	JASON M. MANDEVILLE	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19,20 and 24-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19,20 and 24-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 19-20 and 24-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirano et al. (hereinafter "Hirano" US 7,277,075) in view of Takayama (US 6,317,157) in view of Murdoch et al. (hereinafter "Murdoch" US 6,897,876) and further in view of Kimura (US 6,475,845).

3. As pertaining to **Claim 19**, Hirano discloses (see Fig. 1, Fig. 3a, and Fig. 3b) a display device for processing multi-color gray-scale data (see Abstract and Col. 1, Ln. 5-16 and Ln. 24-33), comprising:

a four-color converting part (6; see Fig. 3b, in particular) to generate converted RGB data (i.e., Ri, Gi, Bi; Ro, Go, Bo), to extract a white color component (i.e., Yimin) from RGB data (i.e., Ri, Gi, Bi; see Col. 3, Ln. 46-56 and Col. 4, Ln. 14-57), to generate four-color RGBW data (i.e., Ro, Go, Bo, Wo) by subtracting the white color component (Yimin) from the RGB data (Ri, Gi, Bi; see Fig. 4b; also see Col. 5, Ln. 17-51; note that

the white color component in Fig. 4a is shown to be (Bi), which is subtracted from the RGB data (Ri, Gi, Bi) in Fig. 4b) and by adding white gray-scale data (i.e., Wo) to the RGB data (i.e., Ri, Gi, Bi) to generate compensated RGBW gray-scale data (i.e., Ro, Go, Bo, Wo; see Fig. 4c, for example; again, see Col. 5, Ln. 17-51 along with Col. 5, Ln. 65-67 through Col. 6, Ln. 1-7 and Col. 4, Ln. 62-67 through Col. 5, Ln. 1-3);

a data driving part (3; see Fig. 1) to process the compensated RGBW gray-scale data (i.e., Ro, Go, Bo, Wo) provided from the four-color converting part (6) to generate four-color signals in an analog type (see Col. 2, Ln. 40-67 through Col. 3, Ln. 1-32);

a scan driving part (2) to generate scan signals (i.e., gate signals) in sequence (again, see Col. 2, Ln. 40-67 through Col. 3, Ln. 1-32); and

a panel (1) to emit light with a color in response to the four-color signals (i.e., Ro, Go, Bo, Wo) from the data driving part (3) and the scan signals (i.e., gate signals) from the scan driving part (2; again, see Col. 2, Ln. 40-67 through Col. 3, Ln. 1-32), wherein

a white extracting part (see (6, 7, 8) in Fig. 1 and Fig. 3b) is configured to determine which color data (i.e., Ri, Gi, Bi) of the RGB data (i.e., Ri, Gi, Bi) has a minimum value (i.e., (Yimin); see Col. 3, Ln. 46-56 and Col. 4, Ln. 14-57) and to compare (see (7, 9, 10, 11) in Fig. 3b) the minimum value (i.e., Yimin) with a predetermined value (i.e., (Yimax); see Col. 6, Ln. 56-62) relative to the maximum gray scale level (i.e., (Yimax) is the maximum gray scale level and, thus, is inherently relative to the maximum gray scale level; again, see Col. 6, Ln. 56-62 and note the inequality comparing Ymin to Ymax),

the white extracting part (see (6, 7, 8) in Fig. 1 and Fig. 3b) generates the minimum value (Yimin) of the RGB data (i.e., Ri, Gi, Bi) as the white color component (i.e., Wo) if the minimum value (Yimin) is smaller than the predetermined value (Yimax; i.e., when (Yimin) is smaller than (Yimax), the value of (Wo) is the minimum value (Yimin); see Fig. 4b and again, see Col. 6, Ln. 56-62 in conjunction with Col. 5, Ln. 17-51), and

the white extracting part (see (6, 7, 8) in Fig. 1 and Fig. 3b) generates the predetermined value (i.e., Yimax) as the white color component (i.e., Wo) if the minimum value (i.e., Yimin) is equal to the predetermined value (Yimax; i.e., when (Yimin) is equal to (Yimax), the value of (Wo) is equal to Yimax; see Col. 6, Ln. 61-62 in conjunction with Col. 5, Ln. 17-51).

Hirano does not explicitly disclose that the four-color converting part of the display device is implemented to generate gamma-converted RGB data by performing gamma conversion with respect to primary RGB gray-scale data by multiplying each component of the primary RGB gray-scale data by a value of an inverse of a corresponding maximum gray-scale level, and to perform reverse gamma conversion on the four-color RGBW data. Further, Hirano does not show that the four-color converting part performs the disclosed processes on gamma-converted data. However, gamma conversion is well known in the display art as a necessary function for adapting display data to match the gamma characteristics of a specific display. It would have been obvious to one of ordinary skill in the art at the time when the invention was made that a

gamma conversion of the primary RGB gray-scale data and a reverse gamma conversion of the RGBW data can be implemented in order to apply the teachings of Hirano to a specific display device.

In fact, Takayama discloses (see Fig. 1 and Fig. 2) a generic display device (i.e., see (1, 2, 3) of Fig. 2) in which an input RGB signal is adapted to comply with any number of receiving display devices (3; see Abstract and Col. 1, Ln. 29-63 and Col. 2, Ln. 41-51). Takayama discloses (see Fig. 1 and Fig. 2) that the display device (see (2) of Fig. 2) is implemented to generate gamma-converted RGB data by performing gamma conversion (i.e., see (100) of Fig. 1 and see (21a-21c) of Fig. 2) with respect to primary RGB gray-scale data by multiplying each component of the RGB gray-scale data by a value of an inverse of a corresponding maximum gray-scale level (see Col. 6, Ln. 13-57 and Col. 7, Ln. 9-47), and to perform reverse gamma conversion (see (102) of Fig. 1 and see (23a-23c) of Fig. 2) of the RGB data (see Col. 7 Ln. 66-67 through Col. 8, Ln. 1-16). It is a goal of Takayama to provide a generic display device and associated image conversion method in which gamma properties are taken into consideration when performing arithmetic operations on RGB input data in order to improve display performance (again, see Abstract and Col. 1, Ln. 29-63 and Col. 2, Ln. 41-51). Further, Takayama discloses that any number of arithmetic operations can be performed on the gamma converted RGB input data prior to performing reverse gamma conversion of the RGB data in order to improve display performance (see Fig. 1 and Col. 4, Ln. 38-67 through Col. 5, Ln. 1-23). Therefore, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to combine

the teachings of Hirano with the teachings of Takayama in order to improve display performance and to provide a means of implementing the operations of Hirano to comply with any number of receiving display devices. As such, it would have been obvious to one of ordinary skill in the art that the arithmetic operations taught by Hirano (see Fig. 3b) can be implemented in the structure taught by Takayama (see Fig. 1). To this end, it would have been obvious that the reverse gamma conversion taught by Takayama can be performed on the RGBW data as taught by Hirano.

Still, neither Hirano nor Takayama explicitly define the predetermined value in such a way that the white extracting part generates the predetermined value as the white color component if the minimum value is larger than the predetermined value. Further, neither Hirano nor Takayama explicitly state that the display device is an organic electro-luminescent display (OELD) device comprising an OELD panel. However, it would have been obvious to one of ordinary skill in the art at the time when the invention was made that the display device taught by Hirano and Takayama is applicable to any display device utilizing RGB data. In fact, Murdoch discloses (see Fig. 2 and Figs. 8a-8b) an organic electro-luminescent display (OELD; equivalently known in the art as an organic light emitting diode (OLED) display) device (see Col. 1, Ln. 14-48) for processing multi-color gray-scale data (see Abstract), comprising: a four-color converting part (see Fig. 2) to convert primary RGB gray-scale data into compensated RGBW gray-scale data (again, see Fig. 2) by extracting a white color component from the RGB data, generating four-color RGBW data by subtracting the

white color component from the RGB data and by adding white gray-scale data to the RGB data (see Fig. 2 along with Col. 6, Ln. 56-67 through Col. 7, Ln. 1-60 and Col. 8, Ln. 4-24). In addition, Murdoch explicitly discloses that a white extracting part is configured to determine which color data of the RGB data has a minimum value and to compare the minimum value with a predetermined value (i.e., threshold) relative to the maximum gray scale level, the white extracting part generates the minimum value of the RGB data as the white color component if the minimum value is smaller than the predetermined value (i.e., threshold) and the white extracting part can generate the predetermined value (i.e., the white color component can be the threshold value or some value less than the threshold value) as the white color component if the minimum value is larger than the predetermined value (i.e., threshold; see Col. 10, Ln. 24-67 through Col. 11, Ln. 1-10). Murdoch clearly discloses the implementation of a four-color converting system on an OLED display device utilizing a method similar to that disclosed by Hirano. In addition, Murdoch discloses that the implemented method can improve color accuracy and preserve the lifetime of the display. Further, Murdoch teaches that the use of the disclosed predetermined value (i.e., threshold) is instrumental in providing for such preservation of the display. Therefore, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to combine the teachings of Hirano and Takayama with the teachings of Murdoch in order to provide an implementation of the four-color converting part in an OELD display device with improved color and increased lifetime.

As such, it would have been obvious to one of ordinary skill in the art that the predetermined value (i.e., threshold) disclosed by Murdoch can be implemented in the combined invention of Hirano, Takayama, and Murdoch for an OELD panel. Hirano makes it clear that the white color component should be as large as possible in order to increase luminance (see Col. 6, Ln. 46-49). Murdoch makes it clear that the white color component can be limited by a predetermined value (i.e., threshold) in order to avoid using high intensities for any specific OELD and thus preserving the lifetime of the OELD. While Murdoch makes it clear that the white color component should be set equal to or smaller than the predetermined value (i.e., threshold) if the minimum value of the RGB data is larger than the predetermined value (see Col. 10, Ln. 24-67 through Col. 11, Ln. 1-10), Murdoch does not specifically state that the white color component is equal to the predetermined value. However, the combined invention of Hirano, Takayama, and Murdoch, particularly the combined teachings of Hirano and Murdoch, make it clear that (according to Hirano) the white color component should be as large as possible without (according to Murdoch) surpassing the predetermined value (i.e., threshold) in order to increase luminance in the display while maintaining the lifetime of the display. Therefore, it would have been obvious to one of ordinary skill in the art at the time when the invention was made that the white color component can specifically be set to the predetermined value in order to take advantage of the increased luminance disclosed by Hirano and the preserved lifetime of the display disclosed by Murdoch. Further, while such data and scan driving parts are not explicitly shown,

these features are implicit in the combined invention of Hirano, Takayama, and Murdoch for an OELD display.

The teachings of Kimura exemplify the corresponding data and scan driving parts for the OELD panel disclosed by Murdoch. In fact, Kimura discloses (see Fig. 15A, for example) an organic electro-luminescent display (OELD) device for processing multi-color gray-scale data comprising a data driving part (i.e., source signal line side driving circuit) to process gray-scale data to generate color signals in an analog type (see Col. 1, Ln. 34-67 through Col. 2, Ln. 1-41 and Col. 18, Ln. 46-67 through Col. 19, Ln. 1-21); a scan driving part (i.e., gate signal line side driving circuit) to generate scan signals in sequence (again, see Col. 1, Ln. 34-67 through Col. 2, Ln. 1-41); and an OELD panel (see Fig. 15A) to emit light with a color in response to the color signals from the data driving part (i.e., the source signal line side driving circuit) and the scan signals from the scan driving part (i.e., the gate signal line side driving circuit; again, see Col. 1, Ln. 34-67 through Col. 2, Ln. 1-41). Both Murdoch and Kimura disclose an organic electro-luminescent display (OELD) device for processing multi-color gray-scale data. Further, the inventions of Murdoch and Kimura are in the same field of endeavor. Further, Kimura provides a more detailed description of the data and scan driving parts of the OELD panel which are implicit in the invention of Murdoch. Therefore, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to combine the teachings of Kimura with the combined invention of Hirano, Takayama, and Murdoch.

4. As pertaining to **Claim 20**, the combined teachings of Hirano and Takayama discloses (see Fig. 1 and Fig. 3b of Hirano; and see Fig. 1 and Fig. 2 of Takayama) that the four-color converting part includes:

a gamma converting part (see (100) of Fig. 1 and (21a-21c) of Fig. 2 of Takayama) to perform the gamma conversion with respect to the primary RGB gray-scale data to obtain gamma-converted RGB data (see Col. 6, Ln. 13-57 and Col. 7, Ln. 9-47 of Takayama);

the white extracting part (see (6, 7, 8) in Fig. 1 and Fig. 3b of Hirano) to extract the white color component (i.e., Yimin corresponding to Wo; see Col. 3, Ln. 46-56 and Col. 4, Ln. 14-57 of Hirano; also see Col. 5, Ln. 17-51 along with Col. 5, Ln. 65-67 through Col. 6, Ln. 1-7 and Col. 4, Ln. 62-67 through Col. 5, Ln. 1-3 of Hirano) from the gamma-converted RGB data (i.e., Ri, Gi, Bi of Hirano corresponding to the gamma-converted RGB data as taught by Takayama) provided from the gamma converting part (see (100) of Fig. 1 and (21a-21c) of Fig. 2 of Takayama);

a data determining part (i.e., see (6, 9, 10, 11) in Fig. 3b of Hirano) to receive the gamma-converted RGB data (i.e., Ri, Gi, Bi of Hirano corresponding to the gamma-converted RGB data as taught by Takayama) from the gamma converting part (see (100) of Fig. 1 and (21a-21c) of Fig. 2 of Takayama) and the white color component (i.e., Yimin corresponding to Wo; see Fig. 4b and Fig. 4c) from the white extracting part (see (6, 7, 8) in Fig. 1 and Fig. 3b of Hirano) and to generate the four-color RGBW data by subtracting the white color component (i.e., Yimin) from the gamma-converted RGB data (i.e., Ri, Gi, Bi of Hirano corresponding to the

gamma-converted RGB data as taught by Takayama) and adding the white gray-scale data (i.e., Wo) to the gamma-converted RGB data (i.e., Ri, Gi, Bi of Hirano corresponding to the gamma-converted RGB data as taught by Takayama; see Col. 3, Ln. 46-56 and Col. 4, Ln. 14-57 of Hirano; also see Col. 5, Ln. 17-51 along with Col. 5, Ln. 65-67 through Col. 6, Ln. 1-7 and Col. 4, Ln. 62-67 through Col. 5, Ln. 1-3 of Hirano); and

a reverse-gamma converting part (see (102) of Fig. 1 and (23a-23c) of Fig. 2 of Takayama) to perform the reverse-gamma conversion (see Col. 7 Ln. 66-67 through Col. 8, Ln. 1-16 of Takayama) with respect to the four-color RGBW data (i.e., Ro, Go, Bo, Wo as taught by Hirano) provided from the data determining part (i.e., see (6, 9, 10, 11) in Fig. 3b of Hirano) to generate reverse-gamma converted RGBW data to be displayed (again, see Col. 7 Ln. 66-67 through Col. 8, Ln. 1-16 of Takayama).

5. As pertaining to **Claim 24**, Kimura discloses (see Fig. 15A and Fig. 15B) that the OELD panel includes a plurality of pixels each including:

a switching element (1501) having a conduction path to transfer corresponding one of the four-color signals (as disclosed by Murdoch) from the data driving part (i.e., source signal line side driving circuit) in response to corresponding one of the scan signals from the scan driving part (i.e., gate signal line side driving circuit);

a driving element (1502) having a conduction path to transfer a voltage signal provided from a power supply line (1507) in response to the corresponding one of the four-color signals provided from the switching element (1501); and

a organic electro-luminescent element (1503) to generate light in response to the voltage signal provided from the driving element (1502; see Col. 1, Ln. 34-67 through Col. 2, Ln. 1-41).

6. As pertaining to **Claim 25**, Murdoch discloses (see Fig. 8a) that the OELD panel includes a plurality of pixels (112) each including a red sub-pixel (114), a green sub-pixel (116), a blue sub-pixel (118) and a white sub-pixel (120), wherein the red (114), green (116), blue (118) and white (120) sub-pixels each have a stripe shape and are arranged in parallel to each other (see Col. 13, Ln. 33-43).

7. As pertaining to **Claim 26**, Murdoch discloses (see Fig. 8b) that the OELD panel includes a plurality of pixels (112) each including a red sub-pixel (114), a green sub-pixel (116), a blue sub-pixel (118) and a white sub-pixel (120), wherein the red (114), green (116), blue (118) and white (120) sub-pixels are arranged in a 2x2 lattice shape (see Col. 13, Ln. 33-43).

8. **Claim 27** is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirano in view of Takayama in view of Murdoch in view of Kimura and further in view of Miller et al. (hereinafter "Miller" US 2004 / 0113875).

9. As pertaining to **Claim 27**, Murdoch discloses (see Fig. 8b) that the OELD panel includes a plurality of pixels (112) each including a red sub-pixel (114), a green sub-pixel (116), a blue sub-pixel (118) and a white sub-pixel (120), wherein the red (114), green (116), blue (118) and white (120) sub-pixels are arranged in a 2x2 lattice shape (see Col. 13, Ln. 33-43). However, none of Hirano, Takayama, Murdoch, and Kimura explicitly state that the red, green, blue and white sub-pixels are arranged in a 2x3 lattice shape.

However, Miller discloses (see Fig. 2 and Fig. 4) an organic electro-luminescent display (OELD; equivalently known in the art as an organic light emitting diode (OLED) display) device (see Page 1, Para. [0001]-[0002], Page 3, Para. [0033]-[0034] and Page 4, Para. [0072]) for processing multi-color gray-scale data (see Page 1, Para. [0012] and Page 2, Para. [0026]-[0030]), comprising: a four-color converting part (see Fig. 6) to convert primary RGB gray-scale data (86, 88, 90) into compensated RGBW gray-scale data (97, 98, 99) by adding white gray-scale data (93, 95) to the primary RGB gray-scale data (94, 95, 96, 97; see Page 7, Para. [0109]-[0113]). Miller further discloses (see Fig. 10 and Fig. 11) that the OELD panel can include a plurality of pixels (172 in Fig. 10; 202 in Fig. 11) each including red sub-pixels (174, 176 in Fig. 10; 204 in Fig. 11), green sub-pixels (178, 180 in Fig. 10; 206, 208 in Fig. 11), blue sub-pixels (182 in Fig. 10; 210 in Fig. 11) and white sub-pixels (184 through 190 in Fig. 10; 212, 214 in Fig. 11), wherein the red, green, blue and white sub-pixels are arranged in a 2x3 lattice shape (see Fig. 11 and Fig. 12; also see Page 9, Para. [0126]-[0127]). The combined invention of Hirano, Takayama, Murdoch, and Kimura is in the same field of

endeavor as the invention of Miller. Further, Miller provides an example usage of the structure taught by the combined invention of Hirano, Takayama, Murdoch, and Kimura in an OELD device with reduced power usage (see Abstract of Miller). Therefore, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to combine the teachings of Hirano, Takayama, Murdoch, and Kimura with the teachings of Miller.

Further, although Miller does not explicitly disclose that the 2x3 lattice of sub-pixels includes two red sub-pixels, two green sub-pixels, a blue sub-pixel and a white sub-pixel, Miller does disclose that it is potentially more desirable to have more red and green sub-pixels than blue sub-pixels within a pixel (see Page 9, Para. [0126]). Further, Miller provides an example of a 2x3 lattice and a 3x3 lattice of sub-pixels (see Fig. 11 and Fig. 10, respectively) including more red and green sub-pixels than blue sub-pixels. As such, it would have been obvious to one of ordinary skill in the art at the time when the invention was made that the 2x3 lattice of sub-pixels disclosed by Miller can include two red sub-pixels, two green sub-pixels, a blue sub-pixel, and a white sub-pixel.

10. **Claims 28-35** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirano in view of Takayama in view of Murdoch in view of Kimura and further in view of Eida et al. (hereinafter "Eida" US 2001 / 0050532).

11. As pertaining to **Claim 28**, Kimura discloses (see Fig. 8A-8C, 9A-9C, and 10A-10B) that the OELD panel includes:

a first insulating layer (5002) formed on a substrate (5001);

a current control transistor (5006, i.e., EL driving TFT) formed on the first insulating layer (5002), the current control transistor (5006) providing a controlled current (see Col. 13, Ln. 4-19 and 50-67 through Col. 14, Ln. 1-9; also see Col. 17, Ln. 41-67 through Col. 18, Ln. 1-55; and Col. 18, Ln. 56-67 through Col. 19, Ln. 1-47);

a second insulating layer (5007) formed on the current control transistor (5006), the second insulating layer (5007) having contact holes in which source and drain electrodes (5024, 5025) of the current control transistor are formed (again, see Col. 13, Ln. 4-19 and 50-67 through Col. 14, Ln. 1-9; also see Col. 17, Ln. 41-67 through Col. 18, Ln. 1-55; and Col. 18, Ln. 56-67 through Col. 19, Ln. 1-47);

a third insulating layer (5075, 5076) formed on the second insulating layer (5007) and the source and drain electrodes (5024, 5025) of the current control transistor;

a pixel electrode (5082) formed on the third insulating layer (5075, 5076), a part of the pixel electrode (5082) being extended to be in contact with the drain electrode (5024)of the current control transistor through a contact hole formed in the third insulating layer (5075, 5076; see Col. 13, Ln. 4-19 and 50-67 through Col. 14, Ln. 1-9; also see Col. 17, Ln. 41-67 through Col. 18, Ln. 1-55; and Col. 18, Ln. 56-67 through Col. 19, Ln. 1-47);

an organic electro-luminescent layer (5086);

and an electrode layer (5087) formed on the organic electro-luminescent layer (5086) to serve as a cathode (5087) of the OELD device (again, see Col. 13, Ln. 4-19 and 50-67 through Col. 14, Ln. 1-9; also see Col. 17, Ln. 41-67 through Col. 18, Ln. 1-55; and Col. 18, Ln. 56-67 through Col. 19, Ln. 1-47).

None of Kimura, Hirano, Takayama, or Murdoch explicitly discloses partition walls formed on the third insulating layer and the pixel electrode, adjacent ones of the partition walls defining a luminescent region of the OELD panel; and an organic electro-luminescent layer formed on partition walls and the pixel electrode, for emitting red, green, blue and white color light.

However, Eida discloses an organic electro-luminescent device for processing multi-color gray-scale data (see Page 1 through Page 2, Para. [0016]-[0019]) comprising (see Fig. 2, Fig. 3, Fig. 4, and Fig. 7) partition walls (i.e., separating walls) formed on a third insulating layer (3) and the pixel electrode (2), adjacent ones of the partition walls (3) defining a luminescent region of the OELD panel (see Page 3, Para. [0067] and [0072]; Page 4, Para. [0090]-[0091]; Page 6, Para. [0129]-[0135]; and Page 7, Para. [0149]-[0160]); and an organic electro-luminescent layer (4) formed on partition walls (3) and the pixel electrode (2), for emitting red, green, blue and white color light (see Page 8, Para. [0172]-[0176]; Page 9, Para. [0197]-[0206]; and Page 10 through Page 11, Para. [0234]-[0244]). Murdoch, Kimura, and Eida all disclose an organic electro-luminescent device for processing multi-color gray-scale data. Further, Kimura and Eida both disclose a structure for the electro-luminescent device comprising

insulating layers and an organic electro-luminescent layer. While the structures of Kimura and Eida are different, both inventions disclose a means for providing multi-color gray-scale processing and both inventions are in the same field of endeavor. Therefore, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to combine the teachings of Eida with the combined invention of Hirano, Takayama, Murdoch, and Kimura. As such, the combined teachings of Hirano, Takayama, Murdoch, Kimura, and Eida disclose the claimed structure in which the organic electro-luminescent layer emits red, green, blue, and white color light.

12. As pertaining to **Claim 29**, Eida discloses that the adjacent partition walls (3) are formed to define corresponding one of red, green, and blue pixel regions (see Page 8, Para. [0172]-[0176]; Page 9, Para. [0197]-[0206]; and Page 10 through Page 11, Para. [0234]-[0244]). While Eida does not explicitly disclose a defined white pixel region, it would have been obvious to one of ordinary skill in the art that the combined teachings of Hirano, Takayama, Murdoch, Kimura, and Eida must incorporate the white pixel region in the structure.

13. As pertaining to **Claim 30**, Eida discloses that the organic electro-luminescent layer (4) includes red, green, and blue electro-luminescent layers formed on the red, green, and blue pixel regions, respectively, defined by the partition walls (3; again, see Page 8, Para. [0172]-[0176]; Page 9, Para. [0197]-[0206]; and Page 10 through Page 11, Para. [0234]-[0244]). Also, while Eida does not explicitly disclose a defined

white electro-luminescent layer formed on a white pixel region, it would have been obvious to one of ordinary skill in the art that the combined teachings of Hirano, Takayama, Murdoch, Kimura, and Eida must incorporate the electro-luminescent layer formed on the white pixel region in the structure.

14. As pertaining to **Claim 31**, Eida discloses that the electrode layer is a metal layer so that light is reflected by the metal layer and emitted through the substrate (see Page 6 through Page 7, Para. 0129]-[0141]).

15. As pertaining to **Claim 32**, Eida discloses that the electrode layer is transparent so that light passes through the electrode layer (see Page 6 through Page 7, Para. 0129]-[0141]).

16. As pertaining to **Claim 33**, Kimura discloses (see Fig. 8A-8C, 9A-9C, and 10A-10B) that the OELD panel includes:

a first insulating layer (5002) formed on a substrate (5001);

a current control transistor (5006, i.e., EL driving TFT) formed on the first insulating layer (5002), the current control transistor (5006) providing a controlled current (see Col. 13, Ln. 4-19 and 50-67 through Col. 14, Ln. 1-9; also see Col. 17, Ln. 41-67 through Col. 18, Ln. 1-55; and Col. 18, Ln. 56-67 through Col. 19, Ln. 1-47);

a second insulating layer (5007) formed on the current control transistor (5006), the second insulating layer (5007) having contact holes in which source and drain

electrodes (5024, 5025) of the current control transistor are formed (again, see Col. 13, Ln. 4-19 and 50-67 through Col. 14, Ln. 1-9; also see Col. 17, Ln. 41-67 through Col. 18, Ln. 1-55; and Col. 18, Ln. 56-67 through Col. 19, Ln. 1-47);

a pixel electrode (5082), a part of the pixel electrode (5082) being extended to be in contact with the drain electrode (5024) of the current control transistor through a contact hole (5075, 5076; see Col. 13, Ln. 4-19 and 50-67 through Col. 14, Ln. 1-9; also see Col. 17, Ln. 41-67 through Col. 18, Ln. 1-55; and Col. 18, Ln. 56-67 through Col. 19, Ln. 1-47);

an organic electro-luminescent layer (5086).

None of Kimura, Hirano, Takayama, or Murdoch explicitly discloses a color pixel layer formed on the second insulating layer and the source and drain electrodes, the color pixel layer including red, green, blue and white color filters; a planarizing layer formed on the color pixel layer; a pixel electrode formed on the planarizing layer, a part of the pixel electrode being extended to be in contact with the drain electrode of the current control transistor through contact holes formed in the planarizing layer and the color pixel layer; partition walls formed on the planarizing layer and the pixel electrode, adjacent ones of the partition walls defining a luminescent region of the OELD panel; an organic electro-luminescent layer formed on partition walls and the pixel electrode; and a metal electrode layer formed on the organic electro-luminescent layer to serve as a cathode of the OELD device.

However, Eida discloses an organic electro-luminescent device for processing multi-color gray-scale data (see Page 1 through Page 2, Para. [0016]-[0019]) comprising (see Fig. 2, Fig. 3, Fig. 4, and Fig. 7) a color pixel layer (4) formed on a second insulating layer (3) and the source and drain electrodes (52, 60), the color pixel layer (4) including red, green, and blue color filters (11; see Page 3, Para. [0067] and [0072]; Page 4, Para. [0090]-[0091]; Page 6, Para. [0129]-[0135]; and Page 7, Para. [0149]-[0160]; in addition, see Page 8, Para. [0172]-[0176]; Page 9, Para. [0197]-[0206]; and Page 10 through Page 11, Para. [0234]-[0244]); a planarizing layer (10) formed on the color pixel layer (4); a pixel electrode (2) formed on the planarizing layer (10), a part of the pixel electrode (2) being extended to be in contact with the drain electrode (60) of the current control transistor (50) through contact holes (60) formed in the planarizing layer (10) and the color pixel layer (4); partition walls (3) formed on the planarizing layer (10) and the pixel electrode (2), adjacent ones of the partition walls (3) defining a luminescent region of the OELD panel (again, see Page 3, Para. [0067] and [0072]; Page 4, Para. [0090]-[0091]; Page 6, Para. [0129]-[0135]; and Page 7, Para. [0149]-[0160]; in addition, see Page 8, Para. [0172]-[0176]; Page 9, Para. [0197]-[0206]; and Page 10 through Page 11, Para. [0234]-[0244]); an organic electro-luminescent layer (4) formed on partition walls (3) and the pixel electrode (2); and a metal electrode layer (see (2)) formed on the organic electro-luminescent layer (4) to serve as a cathode of the OELD device (see Page 6 through Page 7, Para. 0129]-[0141]). Murdoch, Kimura, and Eida disclose an organic electro-luminescent device for processing multi-color gray-scale data. Kimura and Eida both disclose a structure for

the electro-luminescent device comprising insulating layers and an organic electro-luminescent layer. While the structures of Kimura and Eida are different, both inventions disclose a means for providing multi-color gray-scale processing and both inventions are in the same field of endeavor. Therefore, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to combine the teachings of Eida with the combined invention of Hirano, Takayama, Murdoch, and Kimura. As such, the combined teachings of Hirano, Takayama, Murdoch, Kimura, and Eida disclose the claimed structure in which the color pixel layer includes red, green, blue, and white color filters.

17. As pertaining to **Claim 34**, Eida discloses (see Fig. 3 and Fig. 4) that the red, green, blue, and white (as disclosed by the combined inventions of Hirano, Takayama, Murdoch, Kimura, and Eida) color filters (11) of the color pixel layer (4) are each formed between the current control transistor (50) and the pixel electrode (2) in a corresponding one of the red, green, blue and white pixel regions (again, see Page 3, Para. [0067] and [0072]; Page 4, Para. [0090]-[0091]; Page 6, Para. [0129]-[0135]; and Page 7, Para. [0149]-[0160]; in addition, see Page 8, Para. [0172]-[0176]; Page 9, Para. [0197]-[0206]; and Page 10 through Page 11, Para. [0234]-[0244]).

18. As pertaining to **Claim 35**, Kimura discloses (see Fig. 8A-8C, 9A-9C, and 10A-10B) that the OELD panel includes:

a first insulating layer (5002) formed on a substrate (5001);

a current control transistor (5006, i.e., EL driving TFT) formed on the first insulating layer (5002), the current control transistor (5006) providing a controlled current (see Col. 13, Ln. 4-19 and 50-67 through Col. 14, Ln. 1-9; also see Col. 17, Ln. 41-67 through Col. 18, Ln. 1-55; and Col. 18, Ln. 56-67 through Col. 19, Ln. 1-47);

a second insulating layer (5007) formed on the current control transistor (5006), the second insulating layer (5007) having contact holes in which source and drain electrodes (5024, 5025) of the current control transistor are formed (again, see Col. 13, Ln. 4-19 and 50-67 through Col. 14, Ln. 1-9; also see Col. 17, Ln. 41-67 through Col. 18, Ln. 1-55; and Col. 18, Ln. 56-67 through Col. 19, Ln. 1-47);

a third insulating layer (5075, 5076) formed on the second insulating layer (5007) and the source and drain electrodes (5024, 5025) of the current control transistor;

a pixel electrode (5082) formed on the third insulating layer (5075, 5076), a part of the pixel electrode (5082) being extended to be in contact with the drain electrode (5024)of the current control transistor through a contact hole formed in the third insulating layer (5075, 5076; see Col. 13, Ln. 4-19 and 50-67 through Col. 14, Ln. 1-9; also see Col. 17, Ln. 41-67 through Col. 18, Ln. 1-55; and Col. 18, Ln. 56-67 through Col. 19, Ln. 1-47);

an organic electro-luminescent layer (5086);

and a transparent electrode layer (5087) formed on the organic electro-luminescent layer (5086) to serve as a cathode (5087) of the OELD device (again, see Col. 13, Ln. 4-19 and 50-67 through Col. 14, Ln. 1-9; also see Col. 17, Ln. 41-67 through Col. 18, Ln. 1-55; and Col. 18, Ln. 56-67 through Col. 19, Ln. 1-47).

None of Kimura, Hirano, Takayama, or Murdoch explicitly disclose partition walls formed on the third insulating layer and the pixel electrode, adjacent ones of the partition walls defining a luminescent region of the OELD panel; an organic electro-luminescent layer formed on partition walls and the pixel electrode; and a color pixel layer formed on the transparent electrode layer, the color pixel layer including red, green, blue and white color filters, for emitting red, green, blue and white color light.

However, Eida discloses an organic electro-luminescent device for processing multi-color gray-scale data (see Page 1 through Page 2, Para. [0016]-[0019]) comprising (see Fig. 2, Fig. 3, Fig. 4, and Fig. 7) partition walls (i.e., separating walls) formed on a third insulating layer (3) and the pixel electrode (2), adjacent ones of the partition walls (3) defining a luminescent region of the OELD panel (see Page 3, Para. [0067] and [0072]; Page 4, Para. [0090]-[0091]; Page 6, Para. [0129]-[0135]; and Page 7, Para. [0149]-[0160]); an organic electro-luminescent layer (4) formed on partition walls (3) and the pixel electrode (2; see Page 8, Para. [0172]-[0176]; Page 9, Para. [0197]-[0206]; and Page 10 through Page 11, Para. [0234]-[0244]); a transparent electrode layer (see Page 6 through Page 7, Para. 0129]-[0141]) formed on the organic electro-luminescent layer to serve as a cathode of the OELD device; and a color pixel layer (4) formed on the transparent electrode layer, the color pixel layer (4) including red, green, and blue color filters (11; see Page 3, Para. [0067] and [0072]; Page 4, Para. [0090]-[0091]; Page 6, Para. [0129]-[0135]; and Page 7, Para. [0149]-[0160]; in

addition, see Page 8, Para. [0172]-[0176]; Page 9, Para. [0197]-[0206]; and Page 10 through Page 11, Para. [0234]-[0244]). Murdoch, Kimura, and Eida disclose an organic electro-luminescent device for processing multi-color gray-scale data. Kimura and Eida both disclose a structure for the electro-luminescent device comprising insulating layers and an organic electro-luminescent layer. While the structures of Kimura and Eida are different, both inventions disclose a means for providing multi-color gray-scale processing and both inventions are in the same field of endeavor. Therefore, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to combine the teachings of Eida with the combined invention of Hirano, Takayama, Murdoch, and Kimura. As such, the combined teachings of Hirano, Takayama, Murdoch, Kimura, and Eida disclose the claimed structure in which the color pixel layer includes red, green, blue, and white color filters.

Response to Arguments

19. Applicant's arguments with respect to **Claims 19, 20, and 24-35** have been considered but are moot in view of the new ground(s) of rejection. The applicant has argued that none of the references relied upon in the prior office action, namely Hirano (US 7.277.075), Takayama (US 6,317,157), Miller (US 2004 / 0113875), Kimura (US 6,475,845), or Eida (US 2001 / 0050532), teach or fairly suggest that the white extracting part generates the predetermined value as the white color component if the

minimum value is larger than the predetermined value. The examiner agrees that this limitation does not seem to be taught by any combination of the references to Hirano, Takayama, Miller, Kimura, or Eida. However, this limitation is made obvious in view of the teachings of Murdoch et al. (US 6,897,876). As such, the rejection of **Claims 19-20 and 24-35** is maintained in view of the teachings of Murdoch. Further, the amendments made to **Claim 19** has changed the scope of the claimed invention and, as such, this rejection is made Final.

The examiner would like to point out that the claimed “predetermined value” is given its broadest reasonable interpretation. As such, the claimed “minimum value” can reasonably be considered to be compared to any logical “predetermined value” in order to determine the white color component. With further definition of this "predetermined value" and its relation to the “minimum value" and the “white color component” in the claim language, the claimed invention may be distinguishable from the art of record. Further, the examiner would like to point out the reference to Lee (US 7,151,517) which appears to disclose an invention similar to that disclosed by the applicant.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON M. MANDEVILLE whose telephone number is 571-270-3136. The examiner can normally be reached on Monday through Friday 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on 571-272-7687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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